UNION CARBIDE

NUCLEAR DIVISION NEWS

A Newspaper for Employees of the Nuclear Division, Union Carbide Corporation

Vol. 6, No. 23 November 27, 1975

Industrial energy options assessed in Laboratory study

Industry consumes about 40 percent of the total primary energy used in the United States. But dwindling supplies and higher costs for natural gas and oil, the major industrial fuels, have created a "critical national need" for development of coal and nuclear energy to power American industry in the future.

This is the conclusion of the Oak Ridge National Laboratory study, "An Assessment of Industrial Energy Options Based on Coal and Nuclear Systems," recently completed by the Reactor Division. The study is one in a series on industrial energy supply being conducted by the Laboratory for the Energy Research and Development Administration.

Natural gas reserves

According to the study, natural gas currently makes up more than one-half of the on-site fuel consumed by industry. Further, it now is evident that the nation's reserves of this valuable energy resource are not sufficient to supply both the industrial and residential/commercial sectors.

Therefore, the need to develop alternative sources of industrial energy based on the more plentiful domestic fuels — coal and nuclear — has become critical. The report notes that coal, because of its broader range of application and relative ease of implementation, is expected to be the most important substitute fuel over the next 15 years.

Role of nuclear fuels

In the longer term, however, the study finds that nuclear fuels could assume a major role for supplying industrial steam and, perhaps, high temperature process heat. Conceptual studies and evaluations of advanced nuclear systems for these industrial applications are presently being conducted for ERDA by the Laboratory group.

Collaborating with Laboratory researchers were staff members from eight industrial firms representing the paper, chemical processes, and petroleum refining industries. Their assessment included technical, environmental, economic, and resource-availability aspects of industrial energy supply, now and in the future.

The coal options covered in the study range from environmentally acceptable means of direct coal firing, e.g., burning of low- or high-sulfur coal with stack gas scrubbers, or fluidized bed combustion of high-sulfur coal, to use of gaseous and liquid fuels derived from coal. Generally, the report concludes that the direct firing of coal in industrial boilers and process heaters will be more economical than the use of coal-derived fuels. Consequently, the highest priority should be placed on improved means of burning coal directly.

Attractive technology

Fluidized bed combustion appears to be one of the most attractive of the new technologies, according to the researchers. This method permits the burning of high-sulfur coal because most of the sulfur and other pollutants are removed from the coal in the combustion process.

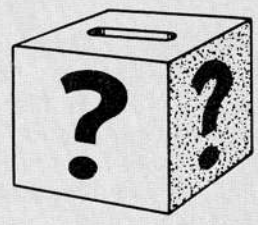
Nuclear options considered were large commercial power reactors as well as small special-purpose industrial reactors, among them a type that could be mounted on barges and towed to industrial sites.

Nuclear energy cheaper

The study found that large commercial nuclear plants offer industrial steam at the lowest cost of all the energy systems investigated. But constraints on implementing this option include long lead times required in planning and construction, difficulties in gaining site approvals, and the administrative burden associated with regulatory requirements.

Participants in the ORNL study were Truman D. Anderson, Howard I. Bowers, Robert H. Bryan, Jerome G. Delene, Eugene C. Hise, John E. Jones Jr., Otto H. Klepper, Sherman A. Reed, and Irving Spiewak, all members of the Laboratory's Reactor Division.

QUESTION BOX



If you have questions on company policy, write the Editor, Nuclear Division News *(or telephone your question in, either to the Editor, or to your plant contact). Space limitations may require some editing, but pertinent subject matter will not be omitted. Your name will not be used, and you will be given a personal answer if you so desire.*

QUESTION: I have a relative who was terminated by a reduction in force at ORGDP about 15 years ago, after working there more than 13 years. Will he have any benefits from Union Carbide when he reaches 62 or 65?

ANSWER: The vested rights provision of the Pension Plan in effect about 15 years ago (1960) established payment of a Pension Benefit at age 65 to any employee whose employment had attained age 40 and had at least 10 years of Company service. In determining the amount of the Pension benefit, only the service earned after age 30 was used for the calculation. Payment of the benefit will start upon receipt of a written request from such employee. A reduced benefit may be requested as early as age 55.

QUESTION: Why is milk in the K-1401 (ORGDP) vending machine priced at 25¢ a pint while milk at other vending machines in the plant is priced at 20¢ for a half-pint?

ANSWER: This question was received in August when the pricing was exactly as indicated. We are in agreement that this kind of pricing does not make much sense. It resulted since the contract between the Industrial Vendors involved and Union Carbide limits the extent to which prices can be advanced. The increase has to be held to that which can be justified by the appropriate Consumer Price Index factor. In August the vendor could not raise the price on both pints and half-pints, which it had wanted to do, and elected to take the increase it was allowed for the half-pint size. Since then, further advances in the Consumer Price Index involved have permitted the vendor to increase the price of a pint of milk from 25¢ to 30¢. It is interesting to note that the price of a *half-pint* of milk in local restaurants is currently 25¢ - 30¢.

QUESTION: In the July 3 issue of "Question Box" a question was raised which pointed out the unfairness of the present pension rule pertaining to age 55. I will soon have 25 years of Company service but if I should die during the next seven years, my wife would receive none of my *earned* pension benefits whatsoever. During all of these years the Company has been setting aside an amount equal to approximately 10 percent of salary for

(Please turn to page four)

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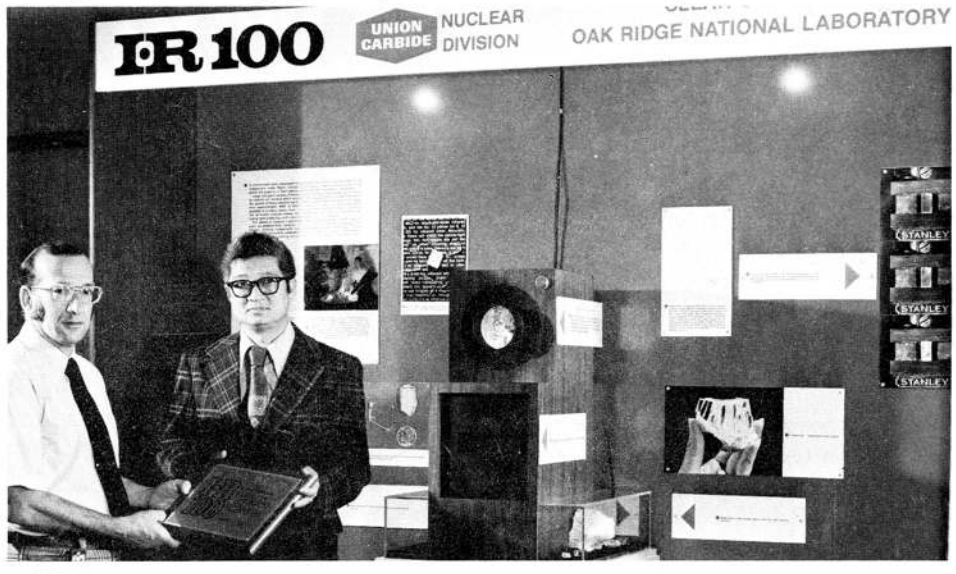


CLEAR CRYSTALS ON DISPLAY — The exhibit that accompanied Marvin Abraham, left, and Yok Chen to Chicago for the presentation of **Industrial Research** *magazine's 1975 IR-100 awards is back in Oak Ridge, installed in the flagpole lobby at Oak Ridge National Laboratory. Since the awards presentation banquet in October, the exhibit has been on display at Chicago's Museum of Science and Industry. Plans are being made to transport it to the other Nuclear Division facilities following its stay at ORNL. Abraham and Chen received the award for their development of a technique for growing large, totally transparent crystals of three alkaline earth oxides. They are research physicists in ORNL's Solid State Division.*

New test results reduce swelling in breeder metals

Oak Ridge National Laboratory researchers have obtained new experimental results which show that radiation-induced swelling of austenitic stainless steels (alloys of the type planned for use in future breeder reactor power plants) can be reduced significantly through relatively small adjustments in the alloy base composition.

Control of the swelling produced by bombardment of reactor materials with high-energy neutrons is a step toward improved fuel system performance in the liquid metal fast breeder reactors (LMFBRs) under development as one of the nation's primary options for a long-term energy source. Breeder reactors are so named because they produce more nuclear fuel than is consumed in the course of generating electricity.

Stainless 'swelling'

Swelling results in the growth and distortion of reactor core components, including the fuel cladding, the duct-shaped wrapper tubes in which clusters of fuel pins are housed, and fuel assembly support structures. For conventional stainless steels, this swelling is of a magnitude which forces the designer to increase the spacing between various core components and thus reduce the rate at which the reactor breeds new fuel — the breeding ratio.

Results of the Oak Ridge experiments demonstrate that swelling in alloys such as "type 316" stainless steel may be reduced to acceptable levels through minor compositional variations and thus take advantage of the fact that this substantial technology and production capacity exist.

Tests begun at the Laboratory in 1974 have shown that controlled additions of titanium and silicon reduce by as much as five to ten times the irradiation-induced swelling of these alloys in ion simulation experiments. If these improvements continue during fast neutron irradiation, the economic benefits to be derived from a low-swelling alloy could run to billions of dollars in the operation of future breeder reactor power plants.

New alloys

Support for this work has been provided by ERDA through its materials science programs of the Division of Physical Research, and the Advanced Fuel Systems Branch of the Division of Reactor Research and Development.

The results of the present experimental studies have been the basis for the design of several new alloys which are being evaluated as part of the National Alloy Development Programs supported by ERDA's Division of Reactor Research and Development. Several national laboratories and industrial contractors participate in this program, whose goal is an advanced LMFBR fuel system by 1985. Design of these alloys has taken into account other considerations in addition to swelling which are important to the LMFBR fuel system. Neutron irradiations are being conducted in the Experimental Breeder Reactor II at ERDA's Argonne National Laboratory.

A key to the Oak Ridge effort has been the ability to screen potential alloys quickly for their expected swelling behavior under reactor conditions. The ORNL experiments have simulated the effects of long-term exposure to fast-neutron irradiation in breeder reactor cores by bombarding test materials with nickel ions from the Laboratory's 5.5 million volt Van de Graaff accelerator.

Economic benefits

With this technique, it has been possible to simulate several years of reactor irradiations in a few hours of exposure to the nickel ions, whose effects then can be correlated with those of fast neutrons in the LMFBR.

In these tests, Laboratory researchers have found several austenitic stainless steels in which swelling is limited to less than 10 percent of the original volume when nickel-ion-irradiated in the annealed condition to exposures equivalent to those expected in future LMFBR's. In the same tests, conventional type 316 stainless steel exhibited a swelling of more than 70 percent in the annealed condition and nearly 30 percent for samples that previously have been cold worked (deformed). Cold working could possibly further enhance the resistance of the new alloys to swelling.

The economic benefits of a low-swelling alloy for breeder applications result primarily from higher conversion ratios for production of new plutonium-239 fuel from fertile uranium-238 and from reductions in the required frequency of fuel loading to achieve the maximum burnup of fuel.

Breeding ratio

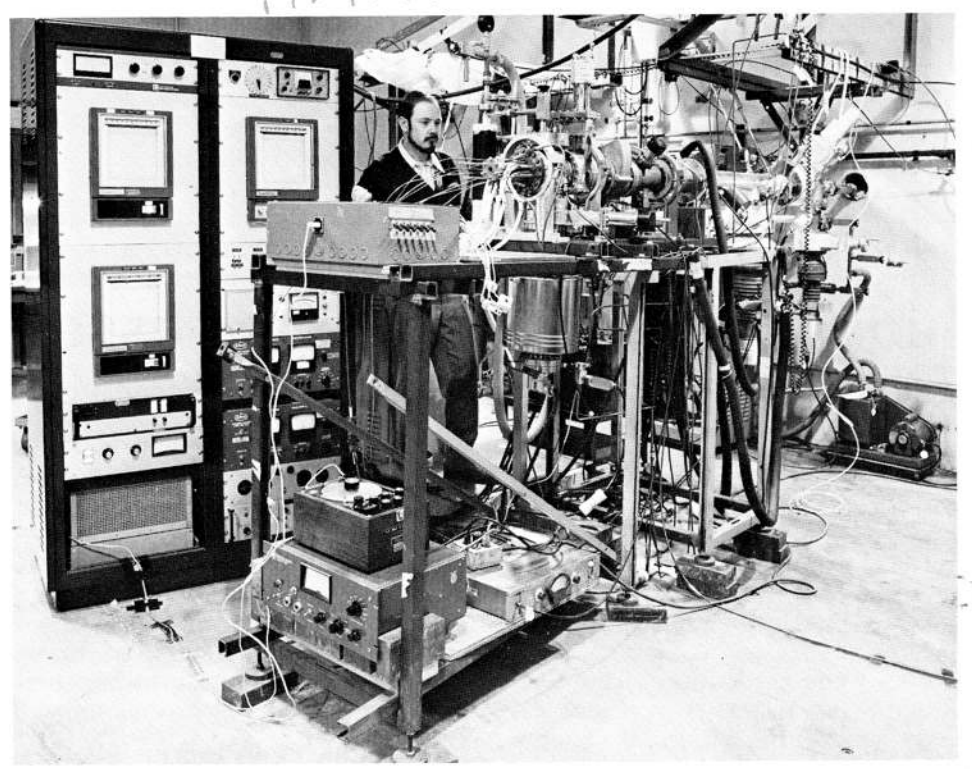
In the LMFBR, fast or unmoderated neutrons produced by the fissioning of plutonium fuel are captured by fertile uranium-238 in the blanket region around the core in order to produce new plutonium-239 fuel. The rate at which this capture takes place, compared to the rate at which plutonium atoms are fissioned to produce the neutrons, is called the breeding ratio.

Bombardment of LMFBR materials with high-energy fast neutrons displaces atoms from the lattice structure of the solid, producing voids (or small holes) that result in an overall decrease in the density of the material and an increase in volume.

During the lifetime of components in a fast breeder reactor, each atom undergoes approximately 1,000 times more such displacements than in present commercial light-water nuclear power reactors. As a result of this and the different temperature regimes, radiation-induced swelling has assumed much greater importance in the design and performance of LMFBR's now under development.

Efficiency increased

Development of a low-swelling alloy offers the promise of greatly improved breeder fuel performance, primarily through achievement of a higher "breeding ratio" in future commercial LMFBR power plant designs and more complete use of the energy available in each fuel loading.



EXPERIMENTAL SETUP — The key to the Laboratory's low-swelling alloy development has been the ability to screen candidate materials quickly for their expected swelling behavior under the fast neutron exposures characteristic of breeder reactor cores. Through bombardment with nickel ions from the 5.5 million volt Van de Graaff accelerator, the effects of several years of reactor irradiations have been simulated in a few hours. Nicholas H. Packan, of the radiation effects and microstructural analysis group in the Metals and Ceramics Division, is shown with the experimental setup.

Control of the swelling behavior of core materials will reduce the required spacing of fuel pins so as not to restrict the flow of the liquid sodium, which travels through these assemblies and is used as the reactor coolant and heat transfer agent. This closer fuel packing, in turn, will increase the efficiency with which neutrons are captured and new fuel is bred. At the same time, by reducing the potential for bowing and warping of fuel elements due to swelling, the design of the reactor internals and fuel-handling equipment will be simplified. A low-swelling alloy will also permit a longer residence time for fuel in the reactor. All of these factors will contribute to greatly improved breeding performance for LMFBR's and to provide substantial savings in power plant fuel cost over a projected 30-year operating life.

Participants

Participating in the Laboratory's low-swelling alloy development are Everett E. Bloom, James M. Leitnaker, Arthur F. Rowcliffe, and James O. Stiegler, all members of the radiation effects and microstructural analysis group in the Metals and Ceramics Division. The division director is James R. Weir Jr., and Carl J. McHargue is manager of materials science research. Nicholas H. Packan and Edward A. Kenik, assisted by Claudette McKamey, Roy A. Buhl, John T. Houston, and Carus K. H. DuBose, have provided technical support.

The accelerated testing was made possible by modifications and operations of the 5.5 million volt Van de Graaff accelerator by Michael J. Saltmarsh, Cleland H. Johnson, Francis K. McGowan, Monte Lewis, Frank A. Dicarlo, and George F. Wells of the Physics Division, whose director is Paul H. Stelson. A significant factor in providing the high ion beam currents used in the accelerated studies was a beam-focusing lens designed by Johnson.

Y-12 PLANT

CAR POOL members from Cherokee Ridge and Cherry Brook subdivisions and Norwood area, Knoxville, to any portal, straight day. Fred Clark, plant phone 3-5101, home 947-1967.

RIDE from Western Avenue section, Knoxville, to Oak Ridge Associated Universities administration building, straight day. Margaretta Douglas, plant phone 483-8411, extension 307, home phone Knoxville 546-2706, or 523-3583.

RIDE or will join car pool from East Village, Oak Ridge, to West Portal, straight day. Doug Woodall, plant phone 3-7763, home phone Oak Ridge 483-8742.

RIDERS from Norwood and Cherokee Ridge Subdivision to Central, East or North Portal, straight day. J. F. Baker, plant phone 3-5935, home phone Powell 947-3396.

CAR POOL members from 504 Woodland Drive, Clinton, to North or Central Portal, straight day. C. W. Anderson, plant phone 3-7392, home phone Clinton 457-2687.

ORNL

RIDE to West Portal from Norwood Community, Clinton Highway, 8 a.m. shift. Joe Tinley, 3-6756.

One or two people to join CAR POOL from Louisiana Avenue - North Seneca area, Oak Ridge, to East Portal, straight day. A. E. St. Clair, plant phone 3-0231, home phone Oak Ridge 482-2766.

Students learn, gain experience during Oak Ridge Science Semester

Twenty-one college juniors and seniors are completing three months of research at Oak Ridge National Laboratory, under a program which has enabled them to spend the fall semester working with staff members there.

The students are participants in the Oak Ridge Science Semester, a program co-sponsored by the Energy Research and Development Administration and the Great Lakes Colleges Association (GLCA), a consortium of 10 colleges and universities in Indiana, Michigan and Ohio. The Office of Professional and University Relations ORNL coordinates the annual program, which was begun in 1970.

Upon their arrival in Oak Ridge early in September, the current participants were given an orientation to the Laboratory and the community. Next came a three-day training course at Oak Ridge Associated Universities, consisting of lecture and laboratory sessions dealing with the applications of radioactivity and radioactive materials to research.

Following the ORAU course, the students returned to the Laboratory to begin their research assignments. The semester is hardly a vacation from studies: a full 40-hour work week is complemented by an interdisciplinary seminar series and an evening course for each student in either chemistry, physics or biology.

This fall's roster

The GLCA students currently at the Laboratory are, by division:

Analytical Chemistry: Lee A. Adler and James B. Summers;

Biology: Sally A Brennan, Dale L. Dorsett, Jeremy M. Drelich, Mary K. Enlow, Scott P. Layne, Wendy D. Replogle, David L. Sultzer, and Patricia K. Ward;

Biology Division — MAN Program: Robert E. Cape, Joseph T. Meier, Gregory Tennyson, and Susan K. Thieme;

Chemistry: Greg H. Slocum;

Chemical Technology: Karen R. Stuhlmacher;

Computer Sciences: Daniel J. Beckett;

Energy: Steven B. Caudill, Brenda R. Shaw, and E. Jonathon Soderstrom;

Health Physics: Thomas L. Buller;

Solid State: Frederick B. Tubbs;

Thermonuclear: Norman F. Carver.

Spring semester: SCUU

A sister program, sponsored by ERDA and the Southern College and University Union (SCUU), is conducted during the spring semester, January to May. The structure of the two Oak Ridge Science Semester programs is identical. Participants are recruited on each campus by a campus representative. Applications from interested students are reviewed by a committee composed of Laboratory and university representatives, who consider each application on the basis of academic qualifications and whether the applicant's interests match ongoing Laboratory research projects.

Once the participants have been selected, a considerable amount of time is devoted to placing them into research programs that will benefit both them and the Divisions in which they might work.

Eighteen schools participate

The Great Lakes Colleges Association consists of Albion College, Albion, Mich.; Denison University, Granville, Ohio; DePauw University, Greencastle, Ind.; Earlham College, Richmond, Ind.; Hope College, Holland, Mich.; Kalamazoo College, Kalamazoo, Mich.; Kenyon College, Gambier, Ohio; Oberlin College, Oberlin, Ohio; Ohio Wesleyan University, Delaware, Ohio, and Wabash College, Crawfordsville, Ind.

The Southern College and University Union includes Birmingham-Southern College, Birmingham, Ala.; Centenary College, Shreveport, La.; Centre College, Danville, Ky.; Fisk University, Nashville; Millsaps College, Jackson, Miss.; Southwestern University, Memphis; University of the South, Sewanee, and Vanderbilt University, Nashville.

Also at the Laboratory this fall under the Science Semester program are two GLCA faculty members, Gordon Johnson of Kenyon College and Jeffrey Jalbert of Denison University. They are simultaneously participating in research projects in two ORNL divisions and acting as advisors and course instructors for the Science Semester. They will remain for eight months after the students leave on December 19, sponsored in the winter and spring by college sabbaticals and in the summer by ORAU.

Johnson is working in the Chemistry Division's inorganic and organic chemistry department, on a spectrographic investigation of the complexation of titanium in borate melts. Jalbert is with the Energy Division, working on a power plant siting project in the regional and urban studies department.

Sherwood Ebey, University of the South, is at ORNL in the Computer Sciences Division. He will be the on-site director of the SCUU Oak Ridge Science Semester. The other SCUU faculty representative will be Charles Girard, Centre College, who will arrive at the Laboratory at the end of December.

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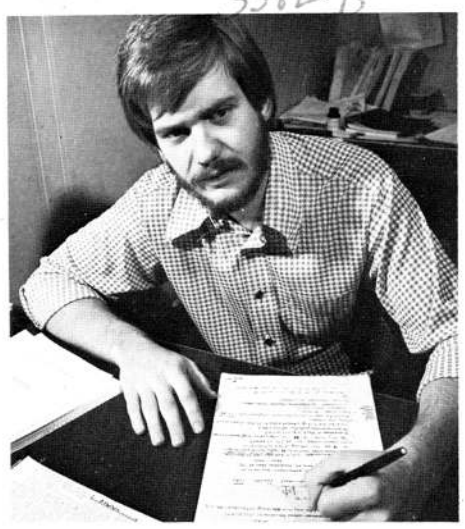

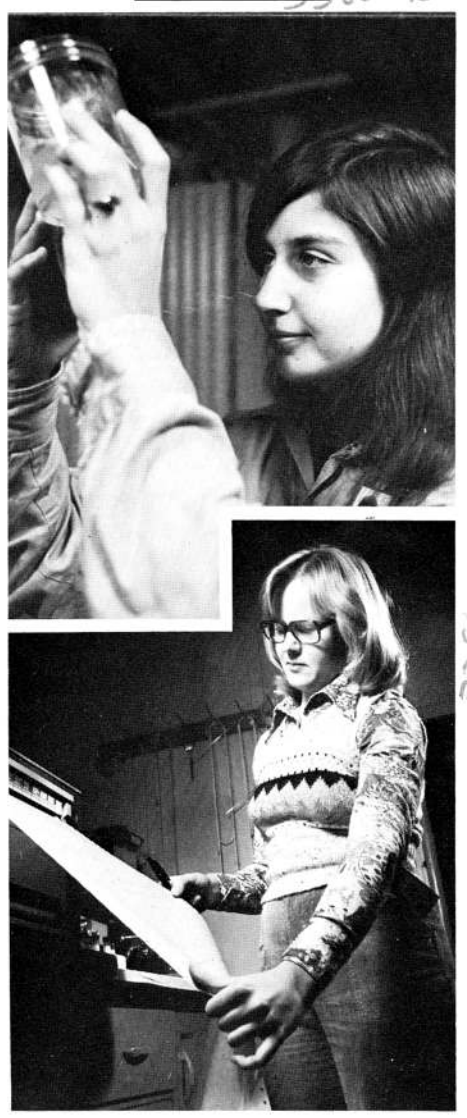

LEARNING ON THE JOB — Some of the Great Lakes Colleges Association students currently spending a "Science Semester" in Oak Ridge work on their research projects. Clockwise from left, above, are Jonathon Soderstrom, Hope College; Brenda Shaw, Earlham College, and Karen Stuhlmacher, DePauw University. The students will conclude a semester of study and research in Oak Ridge in mid-December; early in January the Laboratory will welcome their counterparts from schools in the Southern College and University Union.

Foremen named

Y-12, Paducah Plants promote four

16371 16372

G. D. Watson

J. S. Wilson

Gerald D. Watson and John S. Wilson have been promoted to utilities foremen in the Shift Superintendents and Utilities Division at the Y-12 Plant.

Watson, who has been with Union Carbide since 1971, previously worked for the A & P Tea Company, Modern Recapping and the City of Oak Ridge.

A native of La Follette, Watson holds a bachelor's degree from The University of Tennessee.

He is married to the former Elizabeth Burnett and they have two children. Their home is at 107 Ashland Lane, Oak Ridge.

Wilson worked for the Chrysler Corporation and Prichard Construction Company prior to joining Union Carbide 21 years ago.

Wilson, a native of Maryville, is married to the former Marie Jones and they have two sons. The family lives in Maryville at 1212 Everett Avenue.

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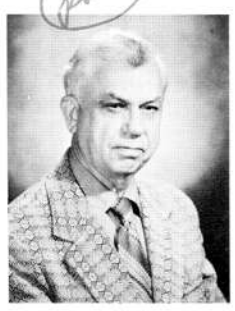
R. E. Elkins



J. K. Luton

Two new foremen have been named at the Paducah Gaseous Diffusion Plant. Robert E. Elkins has been promoted in the Fabrication Maintenance Division and James K. Luton in the Finance and Materials Division.

Elkins, a native of Bloomington, Ill., joined Union Carbide in 1952 as a guard and from 1955 until recently worked as a converter maintenance mechanic. He worked in maintenance in Paducah prior to joining UCC and was a production foreman at C.T.S. for 10 years.

His wife is the former Eva Marie Wilson, and they live at Route 2, Boaz. They have three children.

Luton has been with Union Carbide 24 years. Prior to joining UCC he Co. and the Kolb Brothers Wholesale Drug Co. He is a native of Engleside, Ky.

Mrs. Luton is the former Elsie Hester, and the couple lives at Route 2, Olivet Church Road, Paducah. They have two children.

Scarborough promoted to supervisory trainee

Billy R. Scarborough, Plant and Equipment Division at Oak Ridge National Laboratory, has been promoted to supervisory trainee in research services.

3371-75

B. R. Scarborough

Scarborough joined Union Carbide in 1955 as an apprentice pipefitter. In 1958 he completed his apprenticeship training and was promoted to journeyman pipefitter.

A native of Knox County, Scarborough grew up in Maryville and was graduated from high school there. He and his wife, Doris, have a son and a daughter and reside on Wheatland Drive, Karns.

Y-12 Credit Union picks nominating committee

The Y-12 Employees Federal Credit Union has named its nominating committee for next January. They are Harry C. Raley, chairman, extension 3-7124; L. R. "Dick" Loveless, 3-7748; and Paul B. Petretzky, 3-7735. They welcome suggestions for the four posts that will be open for the new year, two board members and two members of the credit committee.

The meeting will be held January 22. Additional information will follow in later issues of the Nuclear Division News.

Heat exchanger fabricated for Fuel Failure Mockup

The ORNL Mechanical Shop has fabricated a 2,000 kW heat exchanger for the Fuel Failure Mockup (FFM) facility, an experimental rig operated by the Reactor Division as part of the Laboratory's Liquid Metal Fast Breeder Reactor Program to study the hydraulic behavior of LMFBR fuel assemblies.

According to Mario Fontana, program manager for LMFBR safety tests, and Paul Gnadt, project engineer for the FFM, the construction of the heat exchanger is one of a series of steps being taken to increase the testing capacity of the facility. The function of the heat exchanger will be to cool sodium which has flowed through a test subassembly of electric heaters which simulates a portion of a fuel assembly of the type designed for use in the Fast Flux Test Facility reactor at Hanford, Wash., and the Clinch River Breeder Reactor planned for Oak Ridge.

The heat exchanger, made of stainless steel and code stamped in accordance with the rules of the ASME Boiler and Pressure Vessel Code, Section III, Class 3, for Nuclear Components, will be used to remove heat from sodium flowing at a rate of up to 400 gallons per minute and at a maximum temperature of 1,300 degrees F. The exchanger consists of 40 tubes, each about 85 feet long (7/8-inch OD and 3/4-inch ID), which were made into a serpentine. The exchanger was designed by Charles W. Collins, William M. Brown and Robert H. Sigler of Engineering Division and Lewis F. Parsly Jr., of Reactor Division.

According to shop superintendent Ralph E. Jones, a three-step extrusion process was used to fabricate the outlets on the headers. Jones said the process, developed with the assistance of Joseph Prislinger, metallurgist in the Plant and Equipment Division, produced a tube-to-header joint for butt welding that provided good structural integrity at a lower cost than other methods.

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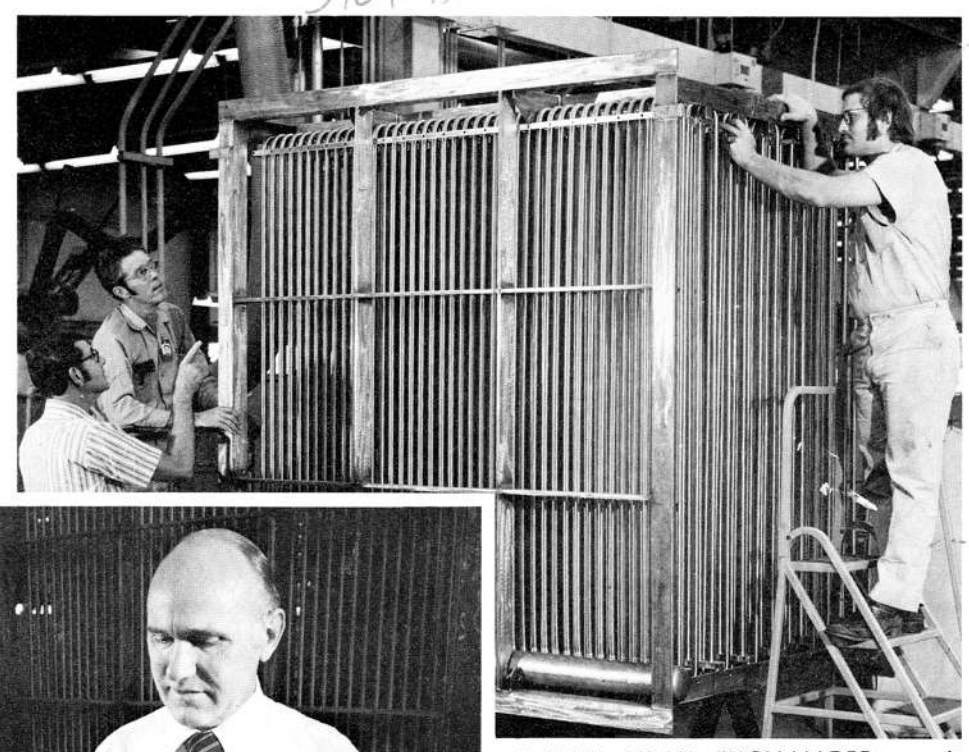
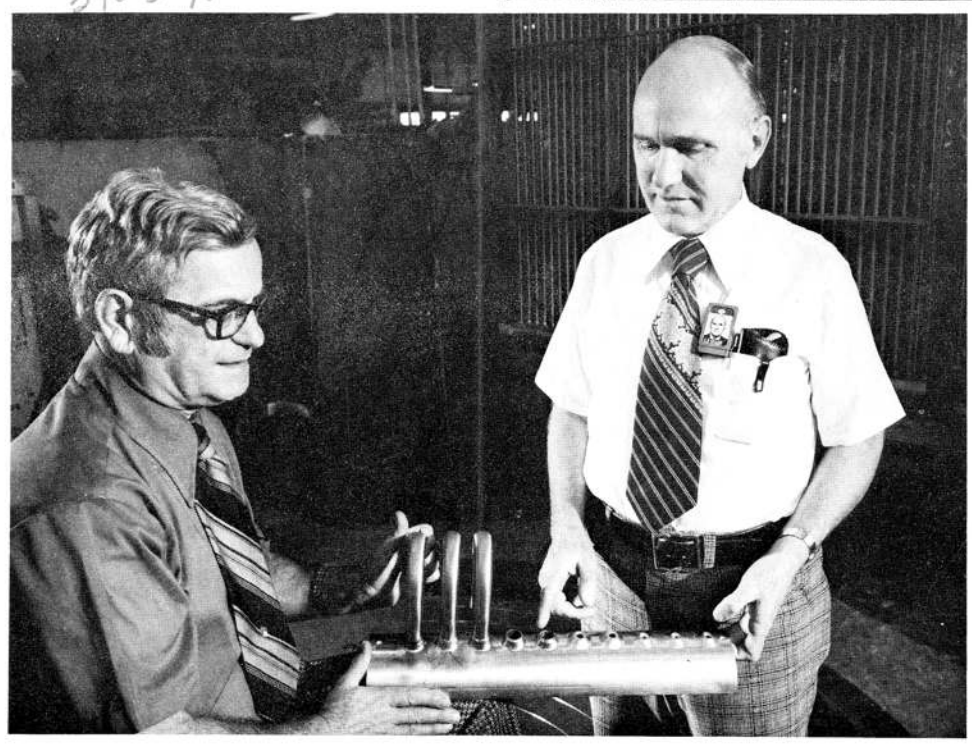


2 MW HEAT EXCHANGER — It resembles a crate of king-size paper clips, but consists of 40 separate stainless steel tubes, each 85 feet long. Boilermaker foreman Coy J. Ward, left, checks out the completed component with John Jackson and Jerry R. Borum.

3103-75



TUBE-TO-HEADER JOINT — Ralph Jones, left, ORNL mechanical shop superintendent; and Charles Collins, Engineering Division, discuss the unique three-step extrusion process used in the construction of the tube-to-header joint for the FFM heat exchanger.

ORNL researchers get ANS publication award

Five Oak Ridge National Laboratory researchers have received an award by the American Nuclear Society's Reactor Physics Division for the best publication in that field during 1973-74.

The award, presented on November 19 at the ANS Winter meeting in San Francisco, was for the paper, "Measurements of the U-238 Capture Cross Section for Incident Neutron Energies up to 100 KeV."

Authors of the paper, published in the ANS journal, "Nuclear Science and Engineering," Vol. 51, August 1973, are Gerard de Saussure, Ernest G. Silver, Rafael B. Perez, Rex W. Ingle, and Hanover Weaver.

All except Ingle, Instrumentation and Controls Division, are members of the Laboratory's Neutron Physics Division. Silver is currently on leave as executive officer of the Institute for Energy Analysis, Oak Ridge Associated Universities.

The uranium-238 capture cross section in the energy range from 1 to 100 keV is one of the most important nuclear parameters in the liquid metal fast breeder reactor (LMFBR) program, the authors pointed out in the introduction to their paper.

They noted that most of the uncertainty in the predicted "breeding ratio," or rate at which new plutonium-239 fuel is produced in LMFBR plants, is contributed by uncertainty in the capture cross section of uranium-238, the fertile material in the reactor core from which plutonium is bred through capture of fast neutrons produced in the fission reaction.

The experiment reported in their award-winning paper was conducted on the Oak Ridge Electron Linear Accelerator (ORELA), using a large liquid-scintillator gamma-ray detector and the time-of-flight technique on a 40-meter neutron flight path.

QUESTION BOX

(Continued from page one)

my pension as an earned benefit held in escrow.

Why wouldn't these monies after the required vesting period, be just as much mine (or my estate's) as if they had been added on to my monthly paycheck? It was and is a part of my total compensation for the work which I perform for the Company. It is wrong for the Company to consider it as a gift.

ANSWER: The key words in your question are "my pension." The funds are indeed set aside for that purpose. If they are used for anything else — such as the payment of a benefit to a widow — it means that there's less money available for pension. Since there are economic limits to the amount that can be put into a pension fund, there are limits to what can be taken out. The primary purpose of our Pension Plan is to provide pensions for retired employees; therefore, the use of the funds for any other benefit is very limited. But the provisions of the Pension Plan are reviewed at regular intervals. When the next review is made, your suggestion, along with suggestions of others, will be considered.

QUESTION: I will soon complete 25 years of Company service and be eligible to receive one of the nice service gifts offered by the Company and perhaps be treated to a free dinner. In lieu of the dinner, why couldn't my wife be sent a bouquet of flowers or some other appropriate gift? I feel she should share any honors I might receive.

ANSWER: The watch, clock, or ring (whichever you selected) is a gift from the Company to you in recognition and appreciation of the fact that you have worked for the Company for 25 years.

The actual presentation of this award is handled differently in various parts of the Nuclear Division. Some supervisors do buy an employee's lunch at Carbide's expense; others call a few employees together for coffee and cake; and still others make the presentation by gathering interested persons together right on the job.

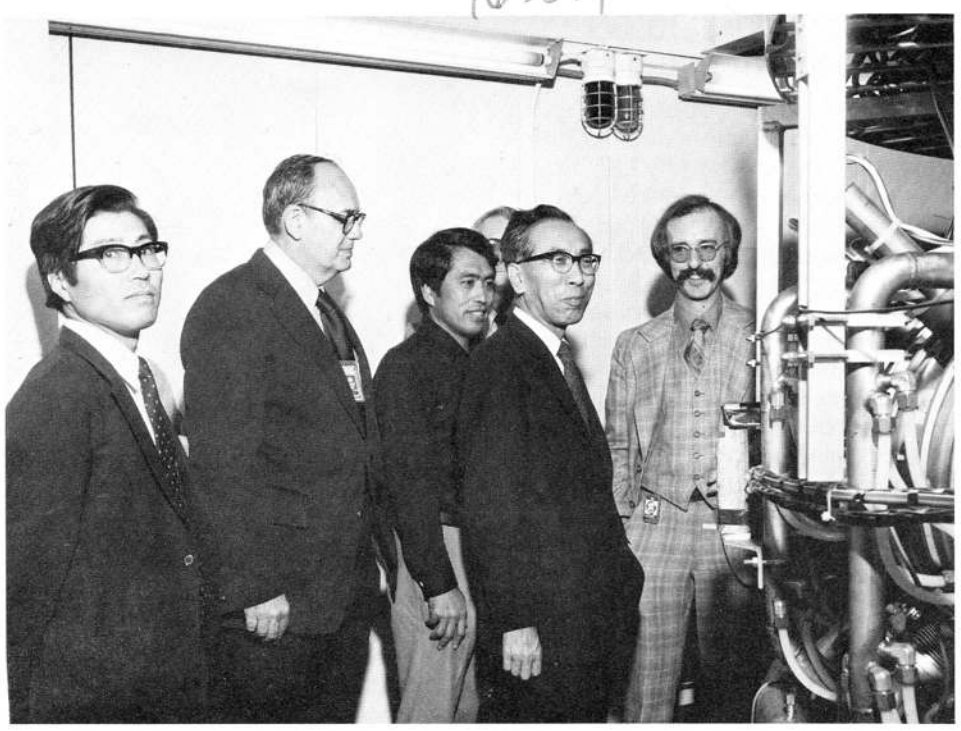
We can appreciate the fact that you want your wife to share in your honors and commend you for this. However, the program for service recognition is intended to be just what it is — a Company and Employee occasion. Perhaps you could add to the day by surprising her with a bouquet of flowers on your own initiative.

QUESTION: The September issue of **Graphic Arts Monthly** states that the Civil Service Commission may soon experiment with "flexitime" which would allow employees to work 40 hours on a flexible daily work schedule with certain restrictions. Has any thought been given to applying "flexitime" to the Nuclear Division? If this idea has been considered but decided against, what are the reasons?

ANSWER: Since the **Graphic Arts** reference to "flexitime" was very brief, we quote it below in its entirety.

"The Civil Service Commission shortly will ask Congress to permit controlled experimentation with "flexitime," the scheme which allows employees to work the required 40 hours on a daily work schedule of their own choosing ... with certain restrictions. None of the graphic arts activities operated by the Government apparently will be included in the experiment. Difficulty in maintaining production schedules, and inevitable trouble with overtime compensation, are the reasons, according to our information."

We have given some consideration to the possible use of "flexitime" but have decided against it for many reasons, some of which are cited in the article; that is, difficulty in maintaining production schedules, the inevitable trouble with overtime compensation, increased difficulty in communication between employees working on the same project, difficulty in keeping track of time worked, etc.



THERMONUCLEAR VISITORS — Tatsuoki Miyajima, Commissioner of the Japanese Atomic Energy Commission, visited ORNL's Thermonuclear Division recently and received a tour and briefing conducted by John Clarke, right, division director. They are, from left, Kenichi Murakami, from the Japanese Embassy in Washington, D.C.; James W. Nehls, ERDA-ORO; Hideo Ikegami, ORNL consultant from the Japanese Atomic Industrial Research Institute; Charles A. Keller, ERDA-ORO; Miyajima; and Clarke.

NEWEST ROTATING EXHIBIT — Oak Ridge National Laboratory's Terry Marlar (left) and Wade Jones study the most recent entry in the Nuclear Division's rotating exhibits program, currently housed in ORNL's flagpole lobby. A joint project of the Laboratory's Metals and Ceramics and Reactor Divisions, the new exhibit details the Heavy Section Steel Technology Program. The two previous exhibits in the rotating exhibit program, prepared by Analytical Chemistry Division and Operations Division, are now circulating among the other Nuclear Division facilities and the Oak Ridge Museum of Atomic Energy. The Heavy Section Steel Technology exhibit will remain at ORNL for about another month.

APPLICATION FOR TICKETS

Requests MUST Be In By November 26

PADUCAH CARBIDE CHILDREN'S CHRISTMAS PARTY

(For Children Ages 2-10)

SATURDAY, DECEMBER 13th 9 A.M.

Doors will open at 8:30 a.m.

ARCADE THEATRE, PADUCAH, KY.

Employee's Name _____ Badge No. _____

Home Address _____

(Please Print Street Address or RFD, City and Zip Code)

Number of your children who will attend the party (please list):

(BOYS)		(GIRLS)	
NAME _____	Date of Birth _____	NAME _____	Date of Birth _____
NAME _____	Date of Birth _____	NAME _____	Date of Birth _____
NAME _____	Date of Birth _____	NAME _____	Date of Birth _____

List names, ages and sex of children accurately. This information will be used to bring present records up to date.

NOTE: Fill out form completely and return as soon as possible, but not later than November 26, to the Recreation Office, Union Carbide Corporation, P.O. Box 1410, Paducah Ky. 42001. Tickets will be mailed to parents at their home addresses.

New FTS plan cuts dialing from 10 to 7 digits December 1

Changes are being adopted in the Federal Telecommunications System December 1. The present 10-digit dialing will be changed to a seven-number plan for all on-net calls. No area code will be used in the new plan.

New 1976 user guides and Energy Research and Development Administration directories are distributed throughout the four Nuclear Division Plants, containing the new numbers along with additional dialing information.

Questions concerning the new system should be directed to the communications office, extension 3-4281, or ERDA information, 3-4313.

HOW TO DO IT

- Dial your FTS Access Code
- Dial the seven digit FTS Telephone Number

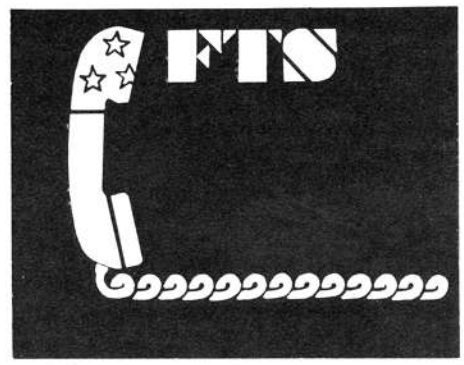
IF YOU DON'T KNOW THE NEW FTS NUMBER:

- Dial the information and Assistance number listed in the 1976 FTS Telephone USERS Guide for the location you're calling.
- Give the attendant the name and agency of the person you're trying to reach. Record the number for future use.
- Hang up and dial the number directly as described in "To Place a Call to Another FTS Telephone Number."

TO PLACE OFFICIAL CALLS TO NON-FTS NUMBERS

(Areas not served by the Automatic off network service)

- Dial the FTS Access Code
- Dial the seven digit Information and Assistance number listed in the 1976 FTS Telephone USERS GUIDE for the city you're calling.



- If the city you're calling is not listed in the USERS GUIDE, call the "TO CALL OTHER CITIES" number at the end of the FTS numbers list for each state.
- Give the attendant your seven digit FTS Telephone Number and the commercial number you're calling.

IF YOU DON'T KNOW THE COMMERCIAL NUMBER:

- Dial your Commercial Access Code.
- Dial the Commercial Area Code for the area you wish to call, plus 555-1212.
- Give the operator the name and address of the person you're calling.
- Record the number for future use and call as described in "To Place Official Calls to Non-FTS Numbers."

After hours off-network calls may be placed via the Washington, D.C., operator.

William Hays, Y-12 veteran, dies in Oak Ridge Hospital

Mr. Hays

William T. Hays, Route 3, Henley Circle, Oliver Springs, died in the Oak Ridge Hospital November 10. A native of Henry County, he first came to Y-12 in 1944 and worked for 12 years, returning in 1967. He was a control center clerk in the Shift Superintendents and Utilities Division.

Survivors include his wife, Joanne Ladd Hays; two daughters, Joyce Moncier and Libby Crossright; a brother, Dudley Hays; and six grandchildren.

Graveside services were held at the Lawnville Cemetery, Kingston, with Henry Anderson of the Oliver Springs Church of Christ officiating.

COMPANY Service 20 25 30

ORGDP

30 YEARS

Chester B. Williams, chemical and general field maintenance; William M. Sproles, metallurgy department; Carlos R. Vanover, TIA barrier manufacturing; Leon White, grounds maintenance department; Louis Alley Sr., building maintenance department; Frank Heilman, compressors and stage equipment development; Charles H. Williams, Oak Ridge area electricity distribution; Edgar H. Hamilton, dimensional inspection; Clarence L. Mitchell, instrument fabrication department; Cecil A. Watson, power and utilities maintenance; William K. Rollins, building maintenance department; Ralph I. Deaderick, Engineering Division.

25 YEARS

Hugh H. Cooper, James E. Cox, Esther E. Case and John C. Hamby.

20 YEARS

Charles L. Francis, Nellie J. Holt, Junior C. Cable, Bill J. Sutton and Curtis A. Anderson.

GENERAL STAFF

25 YEARS

T. F. McCuen and J. Lloyd Smith.

The next issue will be dated December 11. The deadline is December 3.

RECREATIONOTES

VOLLEYBALL PLAY

Following are standings in the three Union Carbide Volleyball Leagues as teams get down to dead-heat competition:

NUCLEAR LEAGUE

TEAM	WON	LOST
1. Rad-Fizz	15	3
2. Pogo's	14	4
3. Over-The-Hill Gang	13	5
4. Computes	9	9
5. Artie's Army	7	8
6. Lucky Spikes	7	11
7. Maxwell Demons	8	13
8. Sloths	5	10
9. Wolfpack	0	15

CARBON LEAGUE

TEAM	WON	LOST
1. The Ball Busters	21	3
2. The Skinks	17	4
3. Hawks	19	5
4. The Group	15	9
5. Gauss House Gang	11	10
6. Sud Soakers	12	12
7. "Are You Sure"	10	14
7. Odds & Ends	10	14
9. The GLCA Students	7	17
10. The Smashers	5	19
11. Rinkey Dinks	2	22

ATOMIC LEAGUE

ITEM	WON	LOST
1. Diggers	17	1
2. Taxi Squad	22	2
3. Quarks	14	7
4. Sportsmanship	9	9
5. Old Men	8	13
5. Ecomoen	8	13
7. Shooting Stars	3	18
8. Electric Bananas	0	18

ORGDP BOWLING

The Payoffs keep a 12 and one-half point lead in the ORGDP Women's League, ahead of the Uptowners. Martha Britt's 607 handicap series was high on a recent night of alleywork.

Jim Hutton, rolling in the K-25 Wednesday League got himself a triplicate patch recently, rolling three games, all with the same scores!

PRESIDENTIAL SPORTS AWARD

George B. Lockhart Jr., Y-12, jogged his way into a Presidential Sports Award early in November.

ORNL BOWLING

The Dynamics have grappled the lead away from contenders in the A League, inches out front of the Recycles. The Woodchoppers' Dick Pawel rolled a 642 handicap series recently to pace the alleymen.

In the C League it's the Remkeys on top by eight points. Frank Kocur socked games away of 245, 170 and 195 for a total of 610, in scratch scoring too! Jim Croley rolled a 247 the same night.

The ORNL Ladies League keeps the Mousechasers still on top of things. Brena Stevens rolled high scratch counts recently, putting a 226 single, 549 handicap away.

The Carbide Family Mixed League keeps the Oops team in charge, with the Challengers moving up. Del Ducay rolled a 559 series; Linda Courny a 487 in scratch accounting recently.

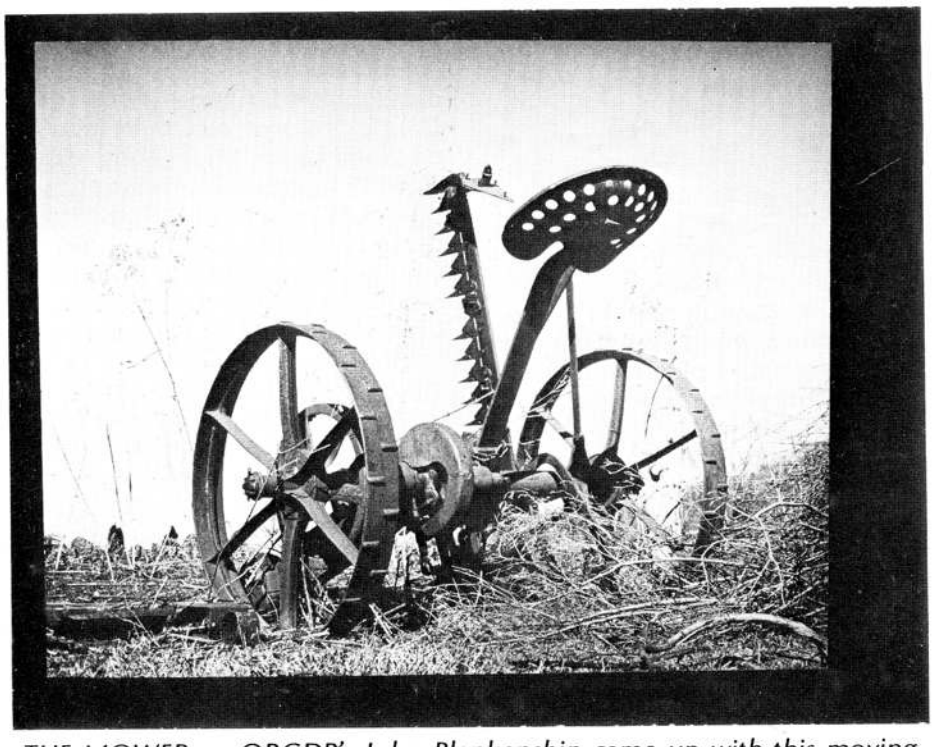
ORGDP MAGICAL MOODS

December 13 is the big day for the K-25 dance. The social hour begins at 8 p.m., dancing at 9. "The Blackwater" outfit will provide music for dancing, and also appearing are Judi Hembree and "The Second Century." There should be ample music for any tastes.

Tickets for the big event are $5 per person and are available in division offices throughout the plant. Tickets are being limited, and there will be no reserved tables ... so action is the word.

The Oak Ridge Civic Center is the scene and the decorating committee is all set to provide the glitter and glamour that goes with the season.

If you cannot find your divisional ticket salesperson ... try Mary Bailey, Karen Lee, Joyce Irving or Faye Duncan in the K-1001 building. They have tickets, or will be able to steer you toward someone who does.



THE MOWER — ORGDP's John Blankenship came up with this moving photograph of a mowing machine, to take an honorable mention in the Carbide Camera Club's annual salon.

Courses added in UT management sciences

Graduate study opportunities in Management Science/Operations Research are provided by U.T. Knoxville's Management Science Program. A revised M.S. degree program has recently been implemented and proposed revisions in the Ph.D. curriculum are under consideration. Both programs provide opportunities to study management science theory, mathematics, statistics and computer science. In addition, the student selects an area of study in which mathematical modeling tools can be applied. Such options include traditional functional areas of business (e.g. accounting, marketing and transportation) as well as non-business fields such as ecology, forestry and public administration.

The U.T. College of Business Administration provides funding for the Management Science program. Three full-time faculty members have been added. In addition student financial aid is available (as well as tuition support from Union Carbide's Educational Assistance Program). Students may be admitted in any quarter on a full or part-time basis. More information can be obtained from the program chairman, Colin Bell (telephone 974-4116 or c/o Management Science Program, College of Business Administration, University of Tennessee, Knoxville, TN 37916).

Y-12 BOWLING

The Rounders hold a four-point lead in C standings, as the season's first half nears an end. They roll along four and one-half points in front of the Sunflowers. The Mini-Strikes' 3123 is high team efforts for the season.

The Ridgers stand two-points tall in the Classic League, with the Rebels and Markers marking time close behind. Bill Reynolds' 711 handicap series still holds good.

The Rollers rolled out in front one and one-half points ahead of the Goofers, as the Mixed League rolls in its final stages for the first half this week and next.

Austinini

KIDS' PARTIES

Plans are set for the parties for Union Carbide children in all four plants. The Paducah affair is scheduled for Saturday, December 13, at the Arcade Theater, downtown Paducah. Doors open at 8:30 a.m. and the party gets underway at 9. A ticket application for the parties appears in another section of this issue.

Oak Ridge plans call for four parties, beginning at 9 and 11 a.m. and 1 and 3 p.m.

All parties include the magic of puppets, cartoons, caroling, and, of course, a visit from St. Nick. Favors will be given each child at the conclusion of each party.

Featured in the four Oak Ridge parties is Y-12's own answer to Houdini and Blackstone, Larry Austin, or Austinini, as he is called in the magic world. His card and coin tricks, his producing rabbits and flowers from hats, and his gift of tongue make him an instant hit wherever he is seen.

Accompanying adults require tickets, as well as each child ... so the applications must be filled in completely. There is no admission charge for any of the parties.

Tickets to all of the parties have been pouring out of the recreation offices ... so get those applications in now. Don't let the youngsters be disappointed by not getting yours in on time.

Application for Tickets To Oak Ridge Christmas Parties

FOR CHILDREN OF UNION CARBIDE EMPLOYEES
(AGES TWO-10 ONLY)
TUESDAY, DECEMBER 23

Plant .....

Employee's Name ..... Badge No. .....

Home Address .....

Plant Address .....

Number of Tickets (Children) .....

Number of Tickets (Adults) .....

— CHECK TIME PREFERRED —

Tuesday, December 23 9 A.M. ..... 11 A.M. ..... 1:00 P.M. ..... 3:00 P.M. .....

Please check first and second choice (write in space "1" or "2") as only a limited number of tickets will be issued for each party. Preference will be given early applicants and if tickets for first choice are exhausted, tickets for second choice will be issued.

Return this form, properly and completely filled in, to the Carbide Recreation Office, Building 9711-5 Stop 1, Y-12 Plant. Please apply for tickets before December 18. The required number of tickets will then be mailed to parents at their home or plant addresses.

4746 (5-21)

Boy or girl? Soon a choice?

By T. A. Lincoln, M.D.

Assume you are young and are starting a family. You are told that you could select the sex of your children. Would you take advantage of this opportunity or would you leave it to chance? At least from a technical standpoint, it is now clearly possible to make such a choice.

By withdrawing a small amount of amniotic fluid ("bag of waters") which surrounds and protects the developing baby, the sex can be determined with almost 100 percent accuracy. This procedure (called amniocentesis) consists of putting a needle through the abdominal wall and uterus and withdrawing the fluid with a syringe. It cannot easily be done until after the twentieth week of pregnancy when the volume of the amniotic fluid reaches an average of 350 ml. Making an accurate diagnosis of the sex of the baby requires waiting until about the thirtieth week. At that time cells can be separated from the fluid and stained. The stain colors the cells either pink or blue, depending on their origin. Although there are always pink and blue cells present, when the percentage of blue cells is less than 20 percent the fetus is male. (An interesting reversal of the popular color designation of sex after birth-namely pink female and blue male!)

Detects birth defects

Although many couples would have overwhelming religious, moral and ethical objections to terminating a pregnancy just because the sex was not right, the option to do so is available now. The above technique is being regularly used to detect serious birth defects so pregnancies can be terminated.

Obviously the best time to make certain that the baby will be the sex desired is when it is actually conceived. Many techniques for doing this are either available now or are just around the corner.

Each sperm carries either an X or Y chromosome. If a Y-bearing sperm penetrates the egg and causes conception, the baby will be male. If an X-bearing sperm gets there first, the baby will be female. About five years ago, the Y chromosome was found to fluoresce brilliantly when strained with quinacrine and examined under fluorescence microscopy. This special staining made various studies of X and Y sperm cells possible.

In 1973, R. J. Ericsson and his colleagues at the Shering Laboratories in West Berlin, Germany, found that the Y-bearing sperm is more vigorous and swims faster. Using this difference in motility, they are able to enrich human sperm so one fraction contains 85 percent bearing the Y chromosome. Using artificial insemination with these Y-enriched sperm, it should be possible to be almost certain that the baby conceived would be male.

The reason for Ericsson's studies was to try to help subfertile couples conceive and to eliminate certain sex-linked genetic disorders. Hemophilia, for example, is passed from carrier mothers only to their sons. By using this technique, a hemophiliac father could produce only sons who would be normal and he could avoid producing carrier daughters.

The above techniques must be considered experimental only, but there are other amazingly simple ways to greatly increase the likelihood of having a son. A greater percentage of sons are produced when the time of ovulation (release of the egg from the ovary) is known. When this occurs, the body temperature goes up a few tenths of a degree. Women who have regular menstrual cycles can carefully check and record their basal temperatures to determine on what day the temperature shift will occur. Repeated inseminations occurring on the six days before the shift are much more likely to produce a male.

More boys during wartime

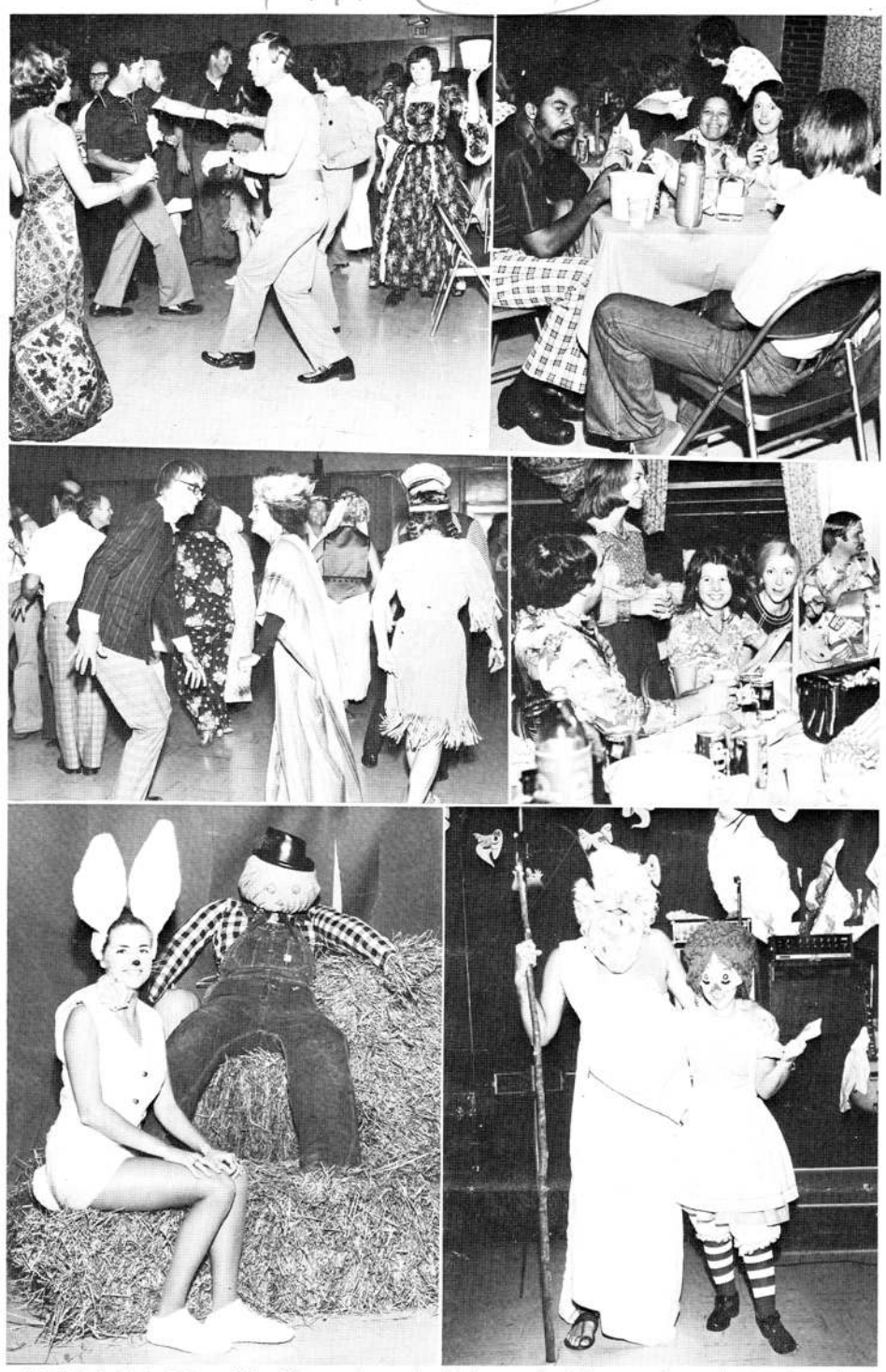
It has long been known that more boys are produced during wartime, in young couples and when conception occurs within 18 months after the marriage. When one considers that the Y-bearing sperm is more vigorous, having it always available in the environment when the egg is released will lead to a much higher percentage of males.

What are the social implications of choosing the sex of one's children? In a small (statistically insignificant) survey conducted on patients being seen in the ORNL dispensary, I found that, given a choice and assuming the family size would be limited to two, most men and women would prefer having one boy and one girl and would have the boy first. One might expect that women under thirty who are still not married might be under the spell of the rising power of women and might vote to have either all girls, or at least a girl first. In my small sample, having a boy first or all boys was clearly the choice of young women.

Excess of males

Under normal circumstances more boys are born and since more of them are surviving to adulthood, several demographers have predicted a future excess of males. One estimated an excess of at least seven percent in the next 20 years. If this were exaggerated by some of the above-mentioned techniques and the first child was always a boy, how would our society change? The firstborn usually has different personality characteristics from the second or later child.

Society resists change or adjusts to it. If such a surplus of men occurred, it could easily be reversed by the same techniques. Men who feel smug because they are the "preferred" sex should recall that if humans followed the pattern of nature, one male would be sufficient for about ten females!



COSTUME BALL — The "Spooktacular" dance held recently at the Paducah plant brought out the weirdos in their fantastic outfits. Mel Ballard, lower left; and Bea Castro, lower right, won costume prizes as Father Time and Raggedy Ann. Plant planners are already busy on the Mistletoe Ball set for December 5, with tickets available through the plant.

Calendar of EVENTS

TECHNICAL
December 1

Biology Division Annual Information Meeting: "A Hypothesis for Radiation Cell Death in the Bacterium *Escherichia coli,*" P. A. Swenson; "The Transcriptional Origin and Primary Sequence of Organelle tRNAs," W. E. Barnett; "The Translation of RNA Extracted from Tumors, Virus, and Normal Tissue," M. P. Stulberg; 1:30 to 3 p.m.

"Turnover of Membrane Molecules," J. S. Cook; "Regulation of Gene Expression in Mammalian Cells," F. T. Kenney; "Mutagenesis Repair and Recombination in Cellular and Lower Organism Systems," R. F. Kimball; and "Mammalian Genetic Studies — Present and Future," W. L. Russell; 3:15 to 5 p.m.

December 11

American Society of Nondestructive Testing Meeting: "NDT and Cost Effective," John K. Aman, E. I. duPont. Alexander Motor Inn, social hour 6:30; dinner 7; and program 8 p.m.

COMMUNITY
December 6-7

Junior Playhouse presents: "I Sincerely Doubt That This Old House Is Very Haunted" (local production).

NUCLEAR DIVISION NEWS

UNION CARBIDE

UNION CARBIDE CORPORATION
NUCLEAR DIVISION

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N 15-218

LARRY AND FRIENDS — Larry Bohanan, Y-12 graphic arts department, visits with some of his "friends" in a special safety show he has developed. From left are Davey, Lisa, Droopy, Maybella Highnote, Oscar Bo and the amazing Hot-Rod Hooty. Bohanan, who took his show to Disney World last week, will present seven more safety programs in the Y-12 Plant next month.

Puppet characters created by Y-12er promote safety

The fanfare is the "Battle Hymn of the Republic" as the house lights dim and the sounds of a motorcycle come screaming into the act. Hot-Rod Hootie takes the center stage.

"Look out, you blockhead! What are you trying to do? Get yourself killed? Why don't you wake up and look where you're going? (Boy, the nerve of some people!)"

Puppet show

It's all part of a safety meeting staged in Y-12 last month, and to be repeated throughout the plant in December, as Larry Bohanan, Y-12 graphic arts department, manipulates his puppets through their "hour upon the stage."

Bohanan has been interested in magic all of his life, but for the past year or so, has taken it seriously. A member of the Fellowship of Christian Magicians and the Smoky Mountain Mystics (a branch of the International Brotherhood of Magicians), he has used his legerdemain and creativity to introduce fellow Y-12ers to Davey, Lisa, Droopy, Maybella Highnote and Oscar Bo, as well as the irresistible Hot-Rod Hootie.

The Y-12 artist presented his talents at Disney World last week, as he and his family vacationed in mid-Florida during the Thanksgiving holidays.

"People like the puppets O.K.," Bohanan admits, "but it's magic that gets most people. Folks know they are being fooled, but don't mind at all. As a matter of fact, they like being 'taken.'"

Knowledge brought home

Davy, one of the characters in Bohanan's skit, continues: "That's right, Lisa. After one safety meeting, Dad came home and taught us a fire escape plan. In fact, he taught me how to climb out the window. He designated a place where we all should meet outside if our house did catch on fire. He also cleaned out the basement and installed a smoke alarm that he bought at the Company Store. He taught me to ride my bike safely and how to use hand tools safely. In fact, Dad tries to keep us safe from all accidents."

The show is accompanied by flashing green lights, to signify a day safely worked at the plant, with Davy's dad returning home from work, bringing his safe working habits with him and passing them on to his family.

One of the highlights of the safety show is the appearance of a white dove, from whence Bohanan is not telling.

A new show he is developing will introduce Willie the Rabbit who will demonstrate the hazards of using a ladder that has been condemned. Other shows are forthcoming, to meet home and at-work situations.

Family help

Bohanan, who will complete 10 years in Y-12 early next year, developed and built his puppets at his West Lonsdale, Knoxville, home. He got a lot of help from his wife, Patsy, and his son and daughter. "They come up with ideas that help me develop my characters," he says.

A graduate of the Famous Artists School, Bohanan likes his hobby and likes to fit it into a worthwhile project at work.

"Bill Damewood, of the Y-12 safety department, gave me a lot of encouragement and assistance. Gail George, medical department, and Raymond Hayes, Materials and Services Division, help me with the puppets," he says.

"It's really quite a bit of fun."

AID TO UNWED MOTHERS

The Florence Crittenton Agency gives temporary homes and medical care to unwed mothers. Casework and group work services are provided also. The United Fund in Anderson and Knox Counties provide needed money to this vital community service. Unwed maternity knows no class, no economic barrier.

COMPANY Service

20 25 30

PADUCAH
20 YEARS

Glenn H. Young, Robert W. Blackburn, James W. Pace and Paul E. Anderson.

Florence M. Allison and Betty J. Freeman.

Y-12 PLANT
30 YEARS

Curtis E. Manis, buildings, grounds and maintenance shops; Clarence L. Riggs, special services; Stanley H. Cole, production radiation testing; Fred B. Guttery, chemical services; Robert H. Freeman, electrical and electronics; John F. Bruce, guard department; and Ira Sharp, machine maintenance.

Y-12 PLANT
30 YEARS

Marcus B. Potter, chemical services; Vermon Huddleston, special services; James J. Finley, Alpha 5 processing; Walter E. Bruce, guard department; Clifford Russell and Rufe A. Moore, ORNL Chemical Services; Harry A. Keen, Shift Superintendents Division; and John K. Chance Jr., engineering services.

25 YEARS

Homer C. Day, Joseph F. Spradlin Jr., John D. Campbell, Addie D. Lynch, Guy L. Seaton Sr., James F. Price, Okey H. Dunaway, Harold E. Cornell, Edward T. Creech, Fred G. Childress, Woodrow W. Chilcoat, John E. Williams, Horace L. Wolfenbarger, Clyde L. Hill, Milton Carlton, James L. Gilliam, Mack R. Braden, Coy H. Harrell, William A. Newman, Calvin A. Proffitt Jr. and William F. Ferguson.

Roy C. McKnight, Curtis W. Ridings, Stanford G. Hull, Tripp S. Swindle, Newton E. Hamby, J. P. Ross Jr., Hall Trivett, Mitt T. Barker, Freddie Hoskey, John R. Johnston, Hobert L. Simmons, Elias W. Whitfield Jr., Basil R. Kitts and James A. Coleman.

Statisticians meet from ERDA complexes

The first meeting of statisticians in the Energy Research and Development Administration was held at Los Alamos November 3, 4 and 5. Organized by Donald A. Gardiner of the mathematics and statistics research department of the Computer Sciences Division, Ronald K. Lohrding, Los Alamos Scientific Laboratory, and Wesley L. Nicholson, Pacific Northwest Laboratories, the symposium was attended by 99 statisticians and other scientists representing ERDA, Nuclear Regulatory Commission, 10 ERDA laboratories, six universities and 11 other contractors.

The purpose of the symposium was to present results of research and discuss problems. Proceedings will be published early in 1976.

Four papers were presented by Union Carbide staff members, as Charles K. Bayne, Forest L. Miller and V. R. R. Uppuluri gave talks. Also participating in the symposium were John J. Beauchamp, Gardiner, David G. Gosslee and W. E. Lever of MSRD and Rodney H. Strand, ORNL's Environmental Sciences Division.

Another such symposium is planned for next October.

PADUCAH MISTLETOE BALL

Paducah employees, families and friends have put December 5 apart to celebrate the approaching holidays with a big dance at the Paducah Civic Center. Festivities get underway at 9 p.m., with dancing set until 1 a.m.

Music will be furnished by the Louisville combo, called "The Dynasty." Tickets are available throughout the plant, and also at the recreation office.

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20 YEARS

Peggy C. Hardin, James D. Goodman, Pauline L. Pemberton and Kenneth L. Johnson.

William J. Grubb, Robert C. Andrews and Tommy R. Justice.

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

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